Navigation Improvement Study

Reconnaissance Report

Taylor Point Basin
Massachusetts Maritime Academy
Bourne, Massachusetts

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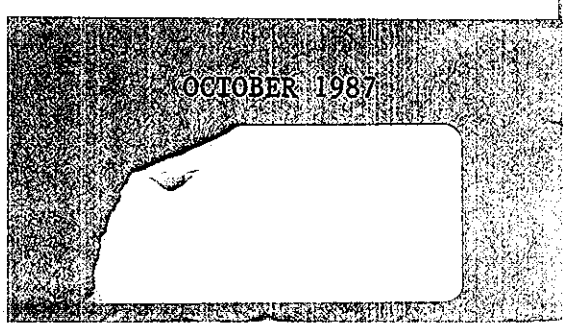

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13. ABSTRACT (Maximum 200 words)

This report examined the feasibility of constructing a breakwater to protect the boat basin at the Taylor Point Basin at the Massachusetts Maritime Academy, Bourne, Massachusetts from wind, wave and ice action damage and reduce the need for frequent maintenance dredging operations. The cost of constructing a concrete A-frame type breakwater for this project was estimated at $3,472,000, representing an annual cost of $331,000 which outweighed the $229,000 in annual benefits to be derived from it. The project, with a benefit to cost ratio of 0.7, is not recommended for further study.

This report consists of a Main Report summarizing the existing conditions and identified problems and opportunities for improvement, the rationale for plan formulation, design and cost estimates, cost-benefit analysis and appended supporting documentation for Economic Analysis, Environmental Analysis and Pertinent Correspondence.

14. SUBJECT TERMS

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RECONNAISSANCE REPORT

PROPOSED BREAKWATER CONSTRUCTION

TAYLOR POINT BASIN

MASSACHUSETTS MARITIME ACADEMY

BOURNE, MASSACHUSETTS

PLAN FORMULATION

Prepared by:
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Project Manager
April 1987

DESIGN AND COST ESTIMATES

Prepared by:
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Civil Engineer
September 1987

TAYLOR POINT BASIN
PRELIMINARY RECONNAISSANCE REPORT

PLAN FORMULATION

Existing Conditions

As can be seen in Figure 1, the Massachusetts Maritime Academy is located at Taylor Point, Bourne, Massachusetts at the head of Buzzards Bay. The smaller Buttermilk Bay forms the western boundary of the Point while the Cape Cod Canal forms the southeastern boundary. Residential areas of the village of Buzzards Bay bound the Academy Campus landward to the north and east.

Land access to the Academy and vicinity is provided via U.S. Route 6, Interstates 195 and 495, state routes 3, 28 and 25. The Cape Cod Scenic Railway provides connections from Cape Cod and Buzzards Bay to Boston and crosses the Canal immediately east of the Academy and the Corps of Engineers Cape Cod Canal Offices. Sea access for deep draft traffic such as the Academy's principal training ship, the Patriot State, is via the Cape Cod Canal. Federal small boat channels lead off the canal to the adjacent harbors of Buttermilk Bay and Onset Harbor. Channels dredged by the Massachusetts Division of Waterways lead off the Canal to Phinneys Harbor and Gray Gables Cove opposite the Academy.

The 550-foot-long Training Ship Patriot State is berthed in a basin dredged off the Canal at the tip of Taylors Point as shown on the photographs attached as Figure 2. Except for the extreme winter months the basin is also used to berth smaller training craft including sailboats, utility boats and a commercial fishing dragger. The smaller craft are relocated to Fairhaven-New Bedford Harbor or dry stored upland.

Problems and Opportunities

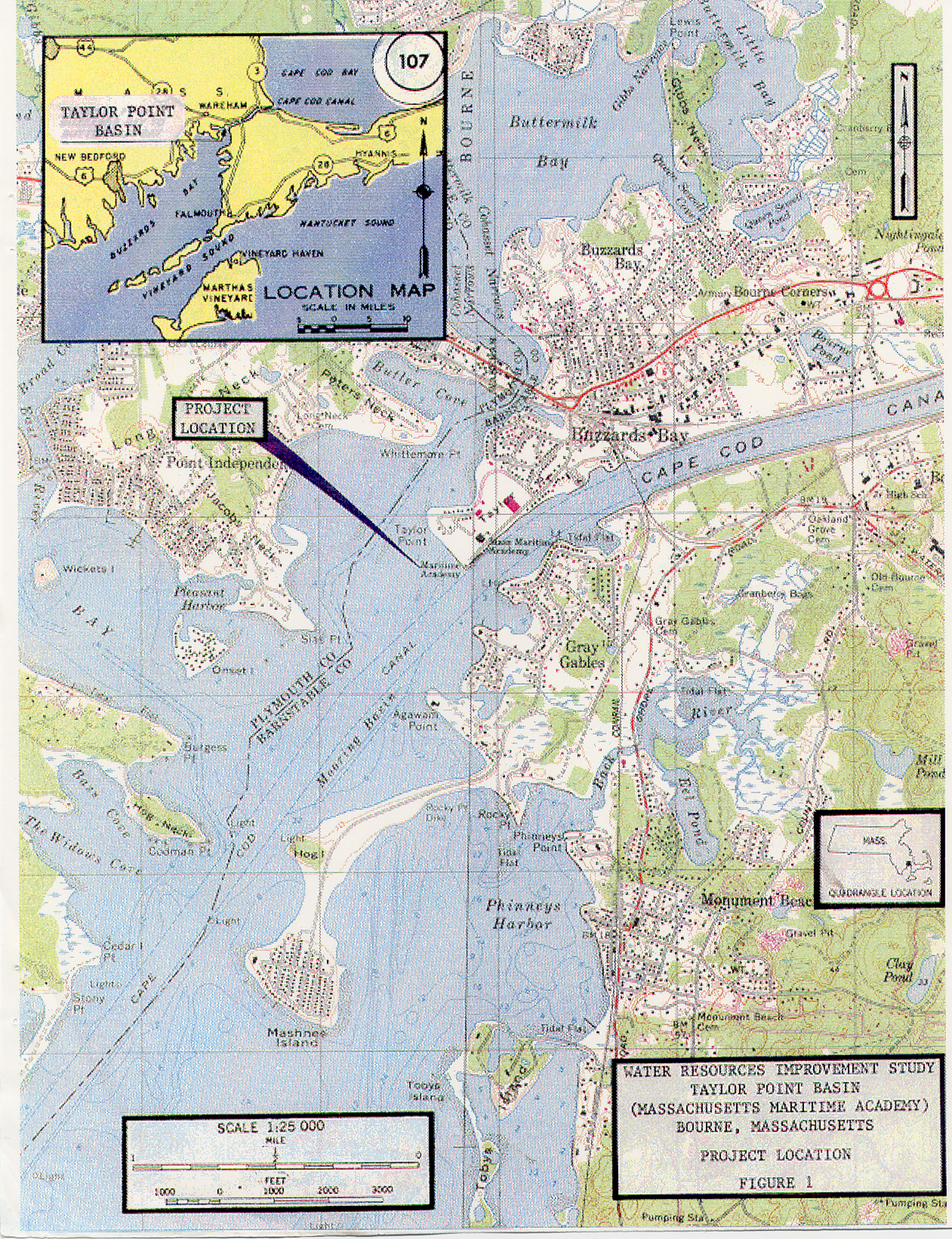
The problems experienced by the Maritime Academy at Taylor Point occupy three general categories:

1) The dredged basin is subject to rapid shoaling necessitating maintenance at 3-year intervals at an average cost of $200,000 per maintenance operation.

2) Wind and waves cause considerable damage to small craft and movement of the berthed Patriot State in response to sea states causes considerable damage to mooring piles, dolphins and the bulkhead. Direct wave and ice action also contributes to bulkhead and piling damage.

3) All of the Academy's smaller craft are relocated in winter as stated previously to avoid additional damage or loss. The Academy has lost 3 vessels in the past 14 years due to wave and ice action, one a sailboat and the other two, steel hulled former naval vessels.

The without project condition is assumed to be a continuation of the existing conditions.



WATER RESOURCES IMPROVEMENT STUDY
TAYLOR POINT BASIN
(MASSACHUSETTS MARITIME ACADEMY)
BOURNE, MASSACHUSETTS

PROJECT LOCATION

FIGURE 1

View to South towards Cape Cod - Buttermilk Bay Shoal in foreground

View to East at TS Patriot State - Cape Cod Canal behind

TAYLOR POINT BASIN
MASSACHUSETTS MARITIME ACADEMY
BOURNE, MASSACHUSETTS

RECONNAISSANCE REPORT
FOR NAVIGATION IMPROVEMENT

FIGURE 2

AERIAL PHOTOGRAPHS

Photos taken July 1, 1986
by Mark Habel, NED

Plan Formulation Rationale

All of the problems described above: basin shoaling, vessel and facilities damage, and vessel relocation costs, could be reduced or eliminated by construction of a structure to protect the basin.

The existing dredged basin is about 700 feet long from the canal-north and 230 to 150 feet wide from the bulkhead-west. Access to the Basin must remain from the Canal. The seaward end of any such structure must be set-back from the Canal's northwest limit to facilitate maintenance of the Canal and so as not to present a navigation hazard to vessels in the Canal. The structure must be adequately marked with lighted navigation aids.

Conceptual breakwater layouts were discussed with academy officials and a dogleg breakwater layout extending west from shore and then south toward the Canal was chosen for analysis.

Both rubble-mound and concrete A-Frame type breakwaters were initially considered. The most damaging storms at this location are hurricanes and gales from the SSW (winds at about 50 mph). Providing full protection during hurricane force storms was considered cost-prohibitive. Providing full protection from significant gales was deemed necessary by the Academy.

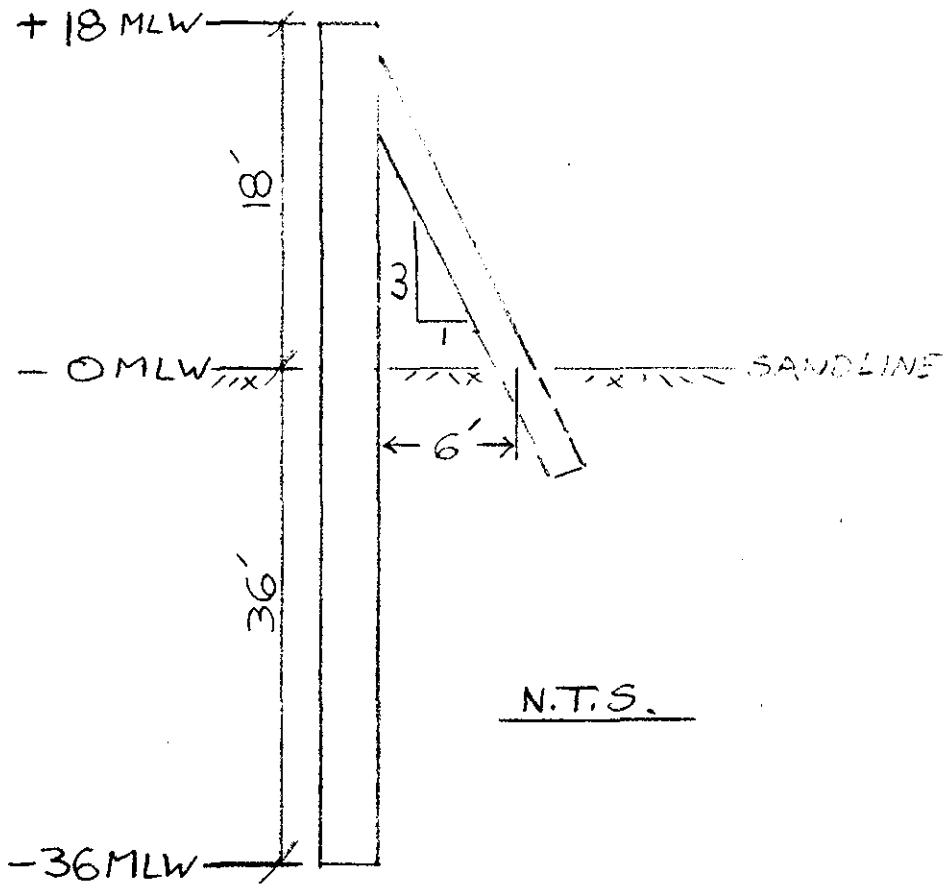
Design of Alternatives

As stated above, two alternative breakwater designs, namely rubblemound and concrete A-Frame, were developed to provide protection from a 50 mph southwest gale. Both designs incorporate identical layouts as shown in Figure 4. After consultation with the Academy to determine present and projected basin size requirements a basin width, shore to breakwater, of 350 feet was assumed. A basin length of 850 feet from the northern channel limit of the Cape Cod Canal was also chosen. These basin dimensions resulted in a dogleg breakwater layout with the structure extending 350 feet west from the riprap slope then 90 degrees and southward for 800 feet to a point 50 feet from the canal's limit. The 50-foot set-back from the Canal channel was deemed necessary to facilitate canal maintenance dredging. A lighted navigation aid, consisting of a steel skeleton tower with a beacon would be located on the end of the structure.

The concrete A-Frame design, as shown in sectionview in Figure 3, was based on the design developed for Bristol Harbor, RI in 1983, adapted to the assumed foundation and storm conditions at Taylor Point. Cost estimates for the A-Frame design are shown on Table 1. Annual costs for both designs are shown in Table 3. The cost estimates for the rubblemound design (Table 2) were developed using September 1987 priced levels for typical structures of this type. Disposal of material dredged to provide a suitable foundation was assumed to be at the Cleveland Ledge Disposal site in Eastern Buzzards Bay.

SUBJECT TAYLOR PT.
COMPUTATION A-FRAME BREAKWATER
COMPUTED BY _____ CHECKED BY _____ DATE September 1987

350' LEG TYPICAL SECTION



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TAYLOR POINT BASIN
MASSACHUSETTS MARITIME ACADEMY
BOURNE, MASSACHUSETTS

FIGURE 3A

CONCRETE A-FRAME BREAKWATER
NORTH LEG

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SUBJECT TAYLOR PT

COMPUTATION A-FRAME BREAKWATER

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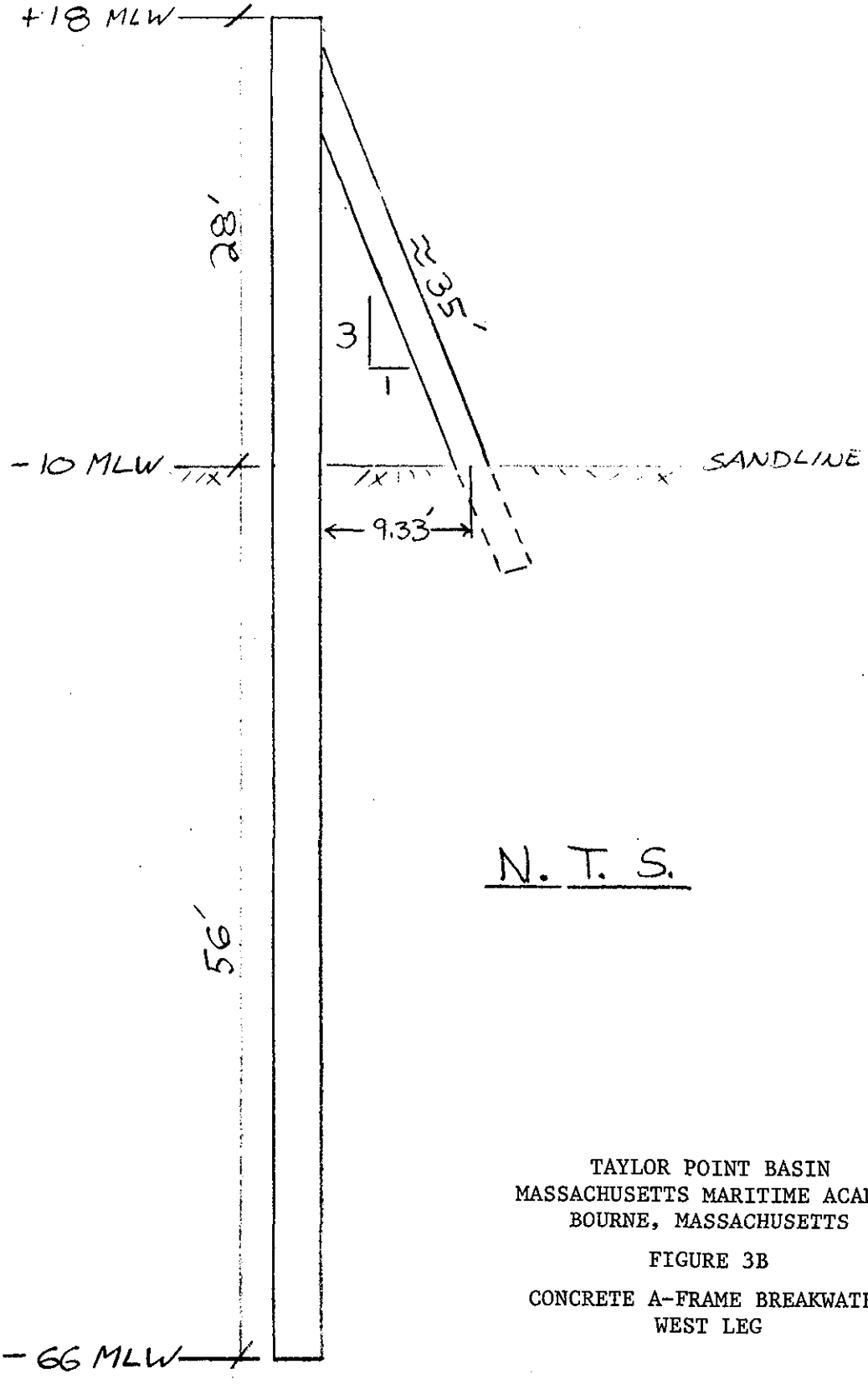
800' LEG TYPICAL SECTION



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TAYLOR POINT BASIN
MASSACHUSETTS MARITIME ACADEMY
BOURNE, MASSACHUSETTS

FIGURE 3B

CONCRETE A-FRAME BREAKWATER
WEST LEG

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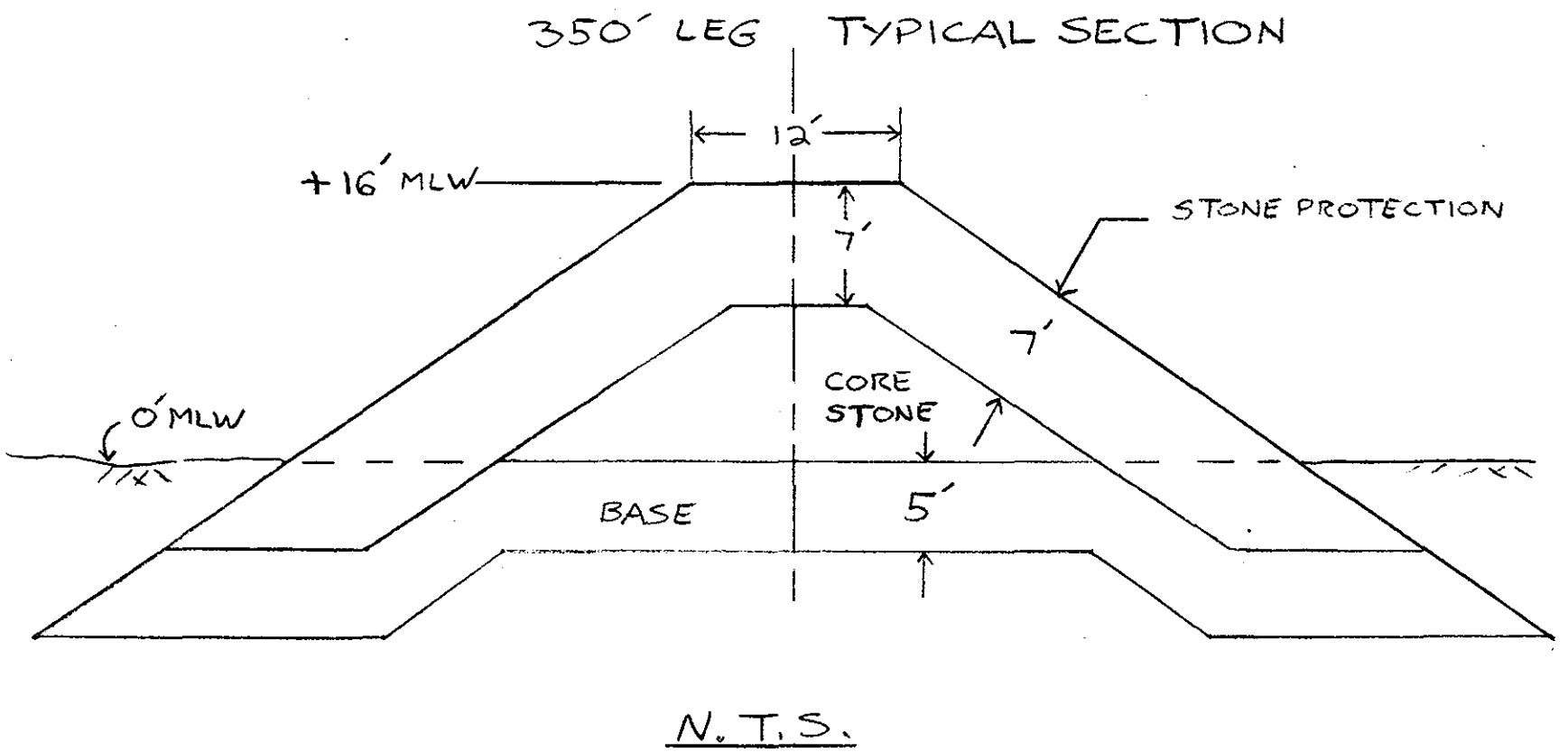

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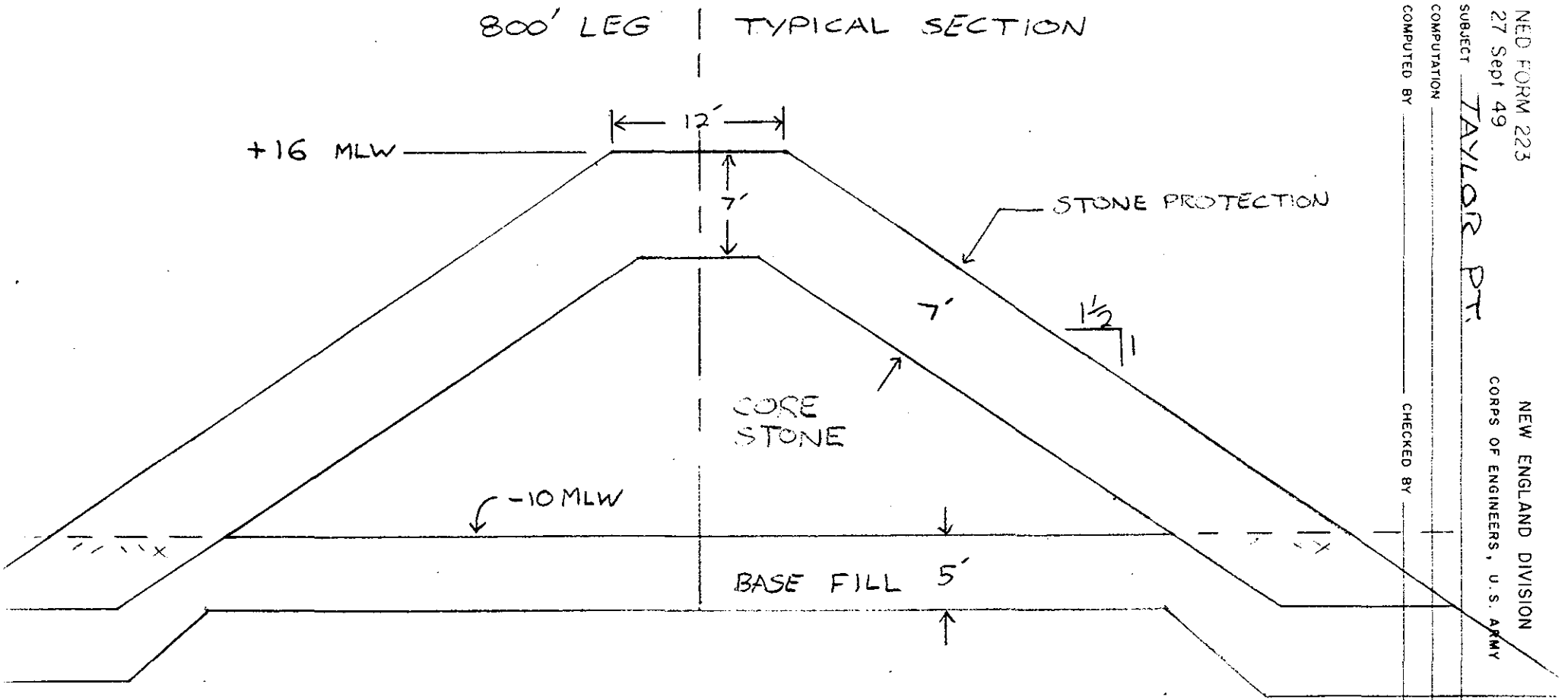
FIGURE 3C

RUBBLEMOUND BREAKWATER DESIGN
NORTH LEG



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TAYLOR POINT BASIN
MASSACHUSETTS MARITIME ACADEMY
BOURNE, MASSACHUSETTS

FIGURE 3D

RUBBLEMOUND BREAKWATER DESIGN
WEST LEG

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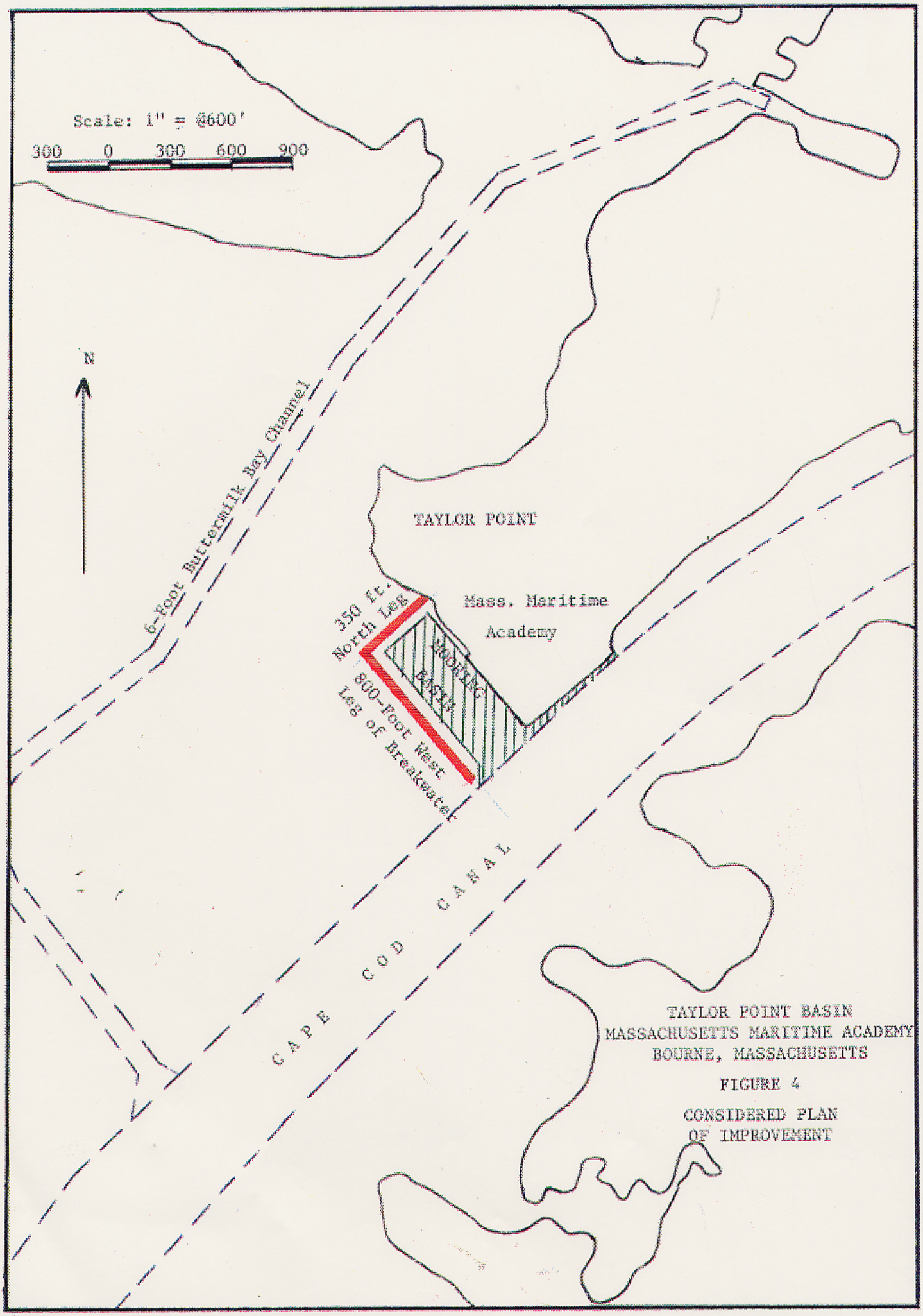

TAYLOR POINT BASIN
MASSACHUSETTS MARITIME ACADEMY
BOURNE, MASSACHUSETTS

FIGURE 4

CONSIDERED PLAN
OF IMPROVEMENT

TABLE 1

TAYLOR POINT BASIN, MASSACHUSETTS

CONCRETE A-FRAME BREAKWATER DESIGN

COST ESTIMATES

FIRST COSTS

Mobilization and Demobilization		$ 66,000
Breakwater Construction		
Concrete Piles - 36" O.D. (8600 LF @ $154)		1,324,000
Batter Piles - HP 12 x 74 (3700 LF @ $63)		233,000
Batter Connection (115 @ $795)		91,000
Coal Tar Epoxy (32,200 SF @ $1.15)		37,000
Precast Concrete Planks (1150cy @ $530)		610,000
Plank Supports (115 @ $596)		69,000
Subtotal		$2,430,000
Contingencies 25%		608,000
Total Construction Cost		$3,038,000
Engineering & Design		210,000
Supervision and Administration		210,000
TOTAL FIRST COST		$3,458,000
INTEREST DURING CONSTRUCTION (10 MONTHS) ($3,458,000 - 10 x 10,34446)		119,000
TOTAL INVESTMENT		$3,577,000
Aids to Navigation (Tower and Beacon)		14,000
TOTAL COST		$3,591,000
	SAY	$3,590,000

(1) The unit costs were obtained from a report submitted by an AE firm for Bristol Harbor, RI in September 1983. The unit costs do not include mobilization and demobilization. Therefore, they have been added separately.

(2) The updated costs were obtained by using an ENR update index, to bring the costs to a July 1987 price level.

TABLE 2
TAYLOR POINT BASIN, MASSACHUSETTS
RUBBLEMOUND BREAKWATER DESIGN
COST ESTIMATES

FIRST COSTS

Mobilization and Demobilization		$ 60,000
Dredging for Foundation		
22,000 cy @ $10.00/cy		220,000
Breakwater Construction		
Core and Base Fill (in place)		
44,800cy @ $30.00		1,344,000
Stone Protection (in place)		
29,700cy @ $50.00		1,485,000
Subtotal		$3,109,000
Contingency 25%		777,000
Construction Cost		$3,886,000
Engineering & Design		207,000
Supervision & Administration		207,000
TOTAL FIRST COST		$4,300,000
INTEREST DURING CONSTRUCTION (10 MONTHS) ($4,300,000 - 10 x 10,34446)		148,000
TOTAL INVESTMENT		$4,448,000
Aids to Navigation (Tower and Beacon)		14,000
TOTAL COST		$4,462,000
	SAY	$4,460,000

TABLE 3
TAYLOR POINT BASIN, MASSACHUSETTS
BREAKWATER DESIGNS
ANNUAL COSTS

CONCRETE A-FRAME DESIGN

Interest and Amortization $3,590,000 x 0.09003 =		$ 323,200
Breakwater Maintenance		7,600
Maintenance of Navigation Aids		1,000
TOTAL		$ 331,800
	SAY	$ 332,000

RUBBLEMOUND DESIGN

Interest and Amortization $4,460,000 x 0.09003 =		$ 401,500
Breakwater Maintenance		9,700
Maintenance of Navigation Aids		1,000
TOTAL		$ 412,200
	SAY	$ 412,000

Benefit Cost Analysis

Project benefits result from reduced maintenance dredging costs for the basin, reduced damages to vessels and shore facilities and reduced vessel relocation costs. Annual benefits as detailed in the Economics Appendix are summarized below:

ANNUAL BENEFITS

Dredging Costs Foregone	$ 73,000
Reduced Facilities Damage	131,000
Reduced Vessel Damage	10,000
Reduced Vessel Relocation Costs	15,000
TOTAL	$229,000

Annual Benefits	$229,000
Annual Costs	332,000
Net Benefits	NONE
Benefit/Cost Ratio	0.7

Conclusions

The annual benefits of the considered breakwater improvement do not outweigh the annual costs. While the project is engineeringly feasible and significant environmental impacts were not identified, the lack of economic justification precludes further Federal involvement under Section 107 authority.

Recommendation

Further study of navigation improvements at the Taylor Point Basin is not recommended.

RECONNAISSANCE REPORT

TAYLOR POINT BASIN
(MASSACHUSETTS MARITIME ACADEMY)
BOURNE, MASSACHUSETTS

ECONOMIC ANALYSIS

PREPARED BY

RICHARD J. RING
PROJECT ECONOMIST

APRIL 1987

ECONOMIC AND RESOURCE ANALYSIS SECTION
IMPACT ANALYSIS BRANCH
U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DIVISION

TAYLOR POINT
BOURNE, MASSACHUSETTS
RECONNAISSANCE REPORT
ECONOMIC ANALYSIS

Study Area

Taylor Point is a peninsula of land located in Bourne, Massachusetts adjacent to the Buzzards Bay or western end of the Cape Cod Canal. The land area of Taylor Point is occupied almost totally by the Massachusetts Maritime Academy. The area under study is the berthing area at the southwestern end of Taylor Point. Since only Academy boats utilize the berthing area, the positive impacts of any navigation improvement plans will be nearly totally localized.

Existing Condition

The Taylor Point berthing area is home port for the Academy's training ship, the 550 foot long T/S Patriot State. Several other smaller training craft also utilize the area. Two major problems currently exist at the berthing area: (i) shoaling and (ii) damage to vessels and shorefront structures. The shoaling is caused by the natural transport of material from Buttermilk Bay. Because of this, the Academy must dredge the berthing area every 3 years to prevent groundings of their vessels. The cost of this dredging is $200,000. The second problem is damage caused to the vessels and shorefront structures such as piers, bulkheads and pile clusters from wave action caused by prevailing winds. In winter, the problem becomes more serious due to the presence of ice.

Plan of Improvement

The plan of improvement for which benefits will be estimated is a breakwater structure. It is designed to prevent shoaling and to protect the berthing area from wave and ice induced damages. The configuration of the breakwater in conjunction with the existing bulkhead will create a small boat basin. The specifications of the breakwater structure are not finalized at this time. It is assumed, for benefit estimation purposes, that the breakwater will prevent 100 percent of the shoaling and damages. Should this not be the case, the benefits will be reduced to coincide with the effectiveness of the structure.

Economic Benefit Estimation

Benefits are estimated at the initial appraisal level and are based on information, both written and verbal, provided by the Planning and Development Engineer at the Massachusetts Maritime Academy. The benefits are based on the dollar value of costs foregone and damages prevented with the plan of improvement in place. The current Federal interest rate of 8 7/8% is used in the analysis.

(i) Dredging Cost Foregone - Under existing conditions the Academy must dredge the berthing area for the T/S Patriot State every 3 years at a cost of $200,000. The ship can't be berthed elsewhere due to its length (550'), draft (27') and its use as a training vessel. If the breakwater were in place, transported material from Buttermilk Bay would be prevented from entering the berthing area and the dredging cost would no longer be incurred every 3 years. To determine the annual benefit for dredging costs foregone, the sum of $200,000 was discounted every 3 years over the 50 year project life. The sum of the present worths was annualized to arrive to a benefit of $72,500.

(ii) Replacement of Single Piles and Pile Clusters - Single piles, 6-pile clusters and 10-pile clusters are constantly being broken off in the berthing area. They break below the water surface at the mudline for the following reasons. First, they are unprotected from high winds and wave action. Secondly, these high winds and waves cause the unprotected T/S Patriot State to lurch against the piles while berthed thereby weakening and damaging them. Thirdly, in the winter season ice damages the piles. Under existing conditions, on average, the Academy must replace two 10-pile clusters, one 6-pile cluster and five single piles each year. With a protected berthing area, these piles would not need to be replaced due to wind, wave and ice damage and the following costs would be saved each year.

2 10-pile cluster @ $25,000/ea. =	$50,000
1 6-pile cluster @ $6,000/ea. =	6,000
5 single piles @ $1,000/ea. =	5,000
Total Annual Benefit =	$61,000

(iii) Repairs to Bulkhead - In 1975 the Academy was forced to spend $1,000,000 for emergency repairs to the bulkhead, piers, and dock caused by wave and tidal action. In 1985, emergency repairs were again performed on the bulkhead due to severe erosion. The cost was $70,000. Based on the historic record of emergency repair costs, it appears that $70,000 is an average annual amount that must be spent on the bulkhead. With the breakwater affording protection to the bulkhead, the emergency expenditure will not be needed and an annual benefit of $70,000 will result.

(iv) Vessels Sunk - In 1973 the Academy lost a sailboat, valued at $20,000, in the berthing area due to wave action. In 1978, two former naval vessels owned by the Academy were sunk in the berthing area after being crushed by ice. The value of these two vessels is unknown, but each had twin screw diesel engines so their value must have been considerable. The Academy now relocates two of its larger training vessels (a commercial fishing boat and utility boat) to Fairhaven, Massachusetts during the winter to avoid the risk in the berthing area. Other smaller craft are transported to Falmouth, Massachusetts by truck for the winter. However, when all of the Academy vessels are in the berthing area it is not unreasonable to project, on average, that under existing conditions, $10,000 in annual damage will be incurred either by

sinkings or wave induced damages while moored. A protected berthing area would eliminate this damage and result in an annual benefit of $10,000.

(v) Relocation of Vessels during Winter - Due to the susceptibility of damage from wind waves and ice, all Academy vessels other than the T/S Patriot State must be relocated during the winter which necessitates extra dollar outlays by the Academy. One large utility vessel is berthed at the Fairhaven Ship Yard and the small training vessels 27' to 53' in length are taken to Falmouth by flatbed truck. The total annual cost for relocating all the Academy boats during the winter in order to avoid damage is $15,000. With the project, these vessels would be protected in the berthing area, would not have to be relocated and a benefit in the form of a $15,000 cost saving would result.

(vi) Harbor of Refuge - An official of the Massachusetts Maritime Academy has indicated that with the breakwater in place the protected basin could be utilized as a harbor of refuge for transient vessels. It is questionable whether the basin could function as a harbor of refuge and if benefits could be credited for this purpose based on Corps of Engineers criteria in ER 1105-2-20.

"Provisions of harbors of refuge is considered entirely distinct from the development of new of existing harbors principally intended to be the homeports of recreational craft or the bases used by commercial fishermen. It is also distinct from the provisions of facilities solely for mooring, wintering, repairing, fueling and supplying small boats."

"Tangible benefits for a harbor of refuge include reduction in storm damages to vessels and their number of accidents. Prevention of vessel damages for normal navigation conditions without the project are not included as harbor of refuge benefits. In determining potential harbor of refuge benefits, consideration is given to the remoteness of the area, the distance to adequate shelter, hazard reputation of the region, and small craft activity - coastwise and local."

Even if the harbor of refuge feature is a legitimate project purpose, it appears that the effort to estimate benefits for it is beyond the scope of the initial appraisal.

Summary of Economic Benefits

Total annual benefits estimated at the initial appraisal level of detail are $228,500.

Benefit Category	Dollar Value	
Dredging Costs Foregone	$72,500	
Reduction of Pile/Cluster Replacement	61,000	
Reduction in Bulkhead Repairs	70,000	
Reduction in Vessel Damage and Sinkings	10,000	
Elimination of Vessel Relocation Costs	15,000	
TOTAL	$228,500	SAY $229,000

Economic Justification

For a project to be economically justified and eligible for Federal participation it must have a benefit/cost ratio of at least 1.

Annual Benefit = $229,000

Annual Costs = $332,000

Benefit/Cost Ratio = 0.7

Net Benefits = None

Environmental Concerns

A Reconnaissance Report
for the
Proposed Breakwater Construction
at
Taylor Point
in
Bourne, Massachusetts

Prepared by
William A. Hubbard
Marine Ecologist

January 1987

Environmental Resource Section
Impact Analysis Branch
U.S. Army Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02254-9149

Environmental Concerns

Project Description

The proposed project consists of the construction of a 251.5 meter (825 foot) A-frame breakwater along Taylor Point in Bourne, Massachusetts. The purpose of this construction is to protect vessels of the Massachusetts Maritime Academy from southerly wind/wave fetch and to reduce the sedimentation rate of the berthing facilities. No dredging is proposed in association with this construction.

Environmental Conditions

a. General

The proposed project area at Taylor Point is presently the site of the Massachusetts Maritime Academy berthing facility. The shoreline is a functional support pier for their training vessels.

b. Physical and Chemical Environment

Subtidally, a tidally scoured sandy environment exists. The confluence of Cape Cod Canal currents and the Cohasset Narrows (Buttermilk Bay) currents create sand accretion southerly of the project area. This shoal area will not be impacted directly by construction, but current alterations may scour the shoal. Some rock or ledge may also be present in the project vicinity (Can, pers. comm. 1987).

Chemical analysis in the vicinity of Cohassett Narrows, the Cape Cod Canal Federal Channel and a proposed channel near Sias Point (NED, 1982) reveal a predominantly sand substrate. The Massachusetts Maratime Academy has a tertiary sewage treatment outfall in the vicinity of Taylor Point. The scouring effects of tidal currents in these areas has deterred the accumulation of chemical contaminations in the substrate.

c. Biological Environment

Local Researchers (Can, pers. comm. 1987) have observed eelgrass beds, Zostera marina, at Taylor Point evolving in response to burial from sand in the littoral drift. Important shellfish species present include: bay scallop, Argopectens irradians; oyster, Crassostrea virginica; and quahog, Mercenaria mercenaria. Lobster, Homarus americanus, are present and one or two recreational pots are usually depoloyed in the project area by Academy staff. Important recreational finfish species include: striped bass, Morone saxatilus; winter flounder, Pseudopleuronectes americanus; and bluefish, Pomatomus saltatrix (NED, 1982; Can, p.c., 1987 and Mass. Div. Mar. Fish, 1987).

Conclusion

The proposed construction of a breakwater will alter current patterns in the project area and impact benthic resources. The significance of the construction and the associated substrate alterations must be assessed by analyzing the densities of the various resources present. Preliminary coordination has identified numerous resource species present in the project vicinity, but no site specific densities are available. Further environmental documentation of this project will require adequate biological sampling and analyses to quantify impacts and assess the significance of this action on shellfish and finfish resources. The construction of the breakwater may benefit the subtidal and littoral areas by providing additional habitat (substrate) diversity. This benefit must be weighed against resource loss due to construction.

BIBLIOGRAPHY

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Mass. Div. Mar. Fish, 1987. Personal Communication, 20 January 1987. Mr. Jack Fisk, biologist, Massachusetts Division of Marine Fisheries, East Sandwich, Mass.

NED, 1982. New England Division, U.S. Army Corps of Engineers. Environmental Assessment of Buttermilk Bay Channel, Bourne, Massachusetts. December 1982, Waltham, Mass.

RECONNAISSANCE REPORT

TAYLOR POINT BASIN

(MASSACHUSETTS MARITIME ACADEMY)

BOURNE, MASSACHUSETTS

PERTINENT CORRESPONDENCE

SEPTEMBER 1987

The Commonwealth of Massachusetts
Massachusetts Maritime Academy
P.O. BOX D, BUZZARDS BAY, MASSACHUSETTS 02532-1803 / Board of Regents of Higher Education

February 5, 1986

Thomas A. Rhen
Colonel, Corps of Engineers
Division Engineer
United States Army Corps of Engineers
424 Toapelo Road
Waltham, MA 02254

RE: Waterfront Improvement Project; Massachusetts Maritime Academy

Dear Colonel Rhen:

Please accept my sincerest thanks and appreciation for scheduling yesterday's meeting at the Corps headquarters to allow the Academy an opportunity to present to you and your staff, our conceptual proposal of a waterfront improvement project that would result in the creation of a boat basin at our campus.

The serious problems that the Academy has to deal with on a much too frequent basis necessitates making permanent and well thought out corrections such as defined by this project.

Our worst and most insurmountable problem at the present time is trying to control the amount of heavy sediment deposited at and in our dock and berthing area, both from incoming tides and from the direction of Buttermilk Bay. Because of this condition, it is necessary to maintenance dredge the berth area to prevent our training vessel, The Patriot State from being left aground.

The construction of a stone breakwater or jetty would provide improved protection to dredging investments, and divert the sediment away from the berth, also it will all but eliminate damage to our vessels caused by wave action, caused by prevailing winds. This breakwater in itself will create a small boat basin which we intend to dredge out to a somewhat uniform depth or draft to accomodate the additional berthing of a second vessel, a supply boat, (somewhat smaller utility boat and fishing vessel) inside the basin. In addition, we intend to extend the existing dock by some three hundred feet by removing the existing rip rap and filling this area in and properly topping it; also, would be the construction of a small pier with attached finger piers to allow us to protectively moor and service our smaller craft.

The importance of completing this project would not only solve our more serious problems, but would greatly improve our cadets' use of our facilities, improve their training and extend their accessibility to the smaller craft and it should also be noted that our training vessel has been designated as part of the United States Navy's Ready Reserve Force (RRF) and must be capable of getting underway within five to ten days after call up in the event of mobilization.

We feel that yesterday's meeting was met with your understanding of these problems and our proposed solution as evidenced by your staff's supportive dialogue.

According to the Corp's guidelines for civil works projects, it is agreed that we have completed Step #1, the initial conference and presentation.

Therefore, I respectfully request that with your approval we move to Steps #2 and #3 and that the Corps begin implementation of a Reconnaisance Study and at its completion that another meeting be held between both our staffs to review and discuss its findings.

We realize that the team approach effort is the only way to gain cost effective and acceptable results in this endeavour. We pledge to you and the Corps our full cooperation.

Sincerely,

John F. Aylmer

John F. Aylmer
RADM, U.S.M.S.
President M.M.A.

cc: Jack Hannon, DEM.
Frank Ciccone - Canal Station
Eugene F. Russo - Planning and Development, M.M.A.

EFR/dma

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF:
NEDPL-C

12 March 1986

SUBJECT: Section 107 Initial Appraisal for Taylor Point Basin, Bourne, Massachusetts

CDR USACE (DAEN-CWP-E)
20 Mass. Ave., N.W.
Washington, DC 20314-1000

1. We have recently received a request asking for the initiation of a small navigation improvement study pursuant to Section 107 of the 1960 River and Harbor Act. The formal request is as follows:

> Bourne, MA - Letter dated 5 Feb 1986 from the Massachusetts Maritime Academy, a State University, of Bourne, Massachusetts requesting improvements to navigation in Taylor Point Basin. A copy of the letter is enclosed.

2. A revolving fund account in the amount of $7,500 has been set up for the completion of the initial appraisal to determine the need for a full scope Section 107 Reconnaissance and Detailed Project Study. State officials of the school are being notified of the establishment of the study fund account and that work will be initiated as soon as capability allows.

FOR THE COMMANDER:

EDWARD D. HAMMOND
LTC, Corps of Engineers
Deputy Commander

Enclosure

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF:

March 12, 1986

Planning Division
Coastal Development Branch

Rear Admiral John F. Aylmer
Massachusetts Maritime Academy
P.O. Box D
Buzzards Bay, Massachusetts 02532-1803

Dear Admiral Aylmer:

I am pleased to inform you that we have initiated a small navigation improvement study for Taylor Point Basin, Bourne, Massachusetts in response to your letter dated February 5, 1986.

The first step will involve making an initial appraisal to determine if further study of providing navigation improvements at Taylor Point Basin, Bourne, Massachusetts is warranted. You will be notified of our findings upon completion of the initial appraisal.

Should you have any questions, please contact the Project Manager, Mr. Ray Korber, at (617) 647-8520.

Sincerely,

Edward D. Hammond
Lt. Colonel, Corps of Engineers
Deputy Division Engineer

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254-9149

REPLY TO
ATTENTION OF

October 27, 1987

Planning Division
Coastal Development Branch

Rear Admiral John F. Aylmer
Massachusetts Maritime Academy
P.O. Box D
Buzzards Bay, Massachusetts 02532-1803

Dear Admiral Aylmer:

The New England Division has completed its Reconnaissance Study of proposed breakwater improvements at Taylor Point Basin, Bourne, MA, conducted under the authority of Section 107 of the River and Harbor Act of 1960, as amended. The attached Reconnaissance Report concludes that further Federal study of this project is not warranted due to insufficient economic justification.

The study evaluated the costs and impacts of two breakwater designs, rubblemound and concrete A-Frame. Both structures were designed to provide full protection to shore facilities and berthed vessels during southwesterly gales and partial protection to shore facilities during hurricanes. At a cost of about $3.6 million, the concrete A-Frame design was the least expensive. However, annual benefits of $229,000 did not outweigh annual costs of $331,000.

Should you have any questions concerning our report, please feel free to me contact at (617) 647-8220, or the Project Manager, Mark Habel, of my staff, at (617) 647-8550.

Sincerely,

Thomas A. Rhen
Colonel, Corps of Engineers
Division Engineer

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254-9149

REPLY TO
ATTENTION OF

CENEDPL-CN (1105-2-10) 27 October 1987

MEMORANDUM FOR: Commander, USACE (CECW-P), 20 Mass. Ave., N.W. Washington, D.C. 20314-1000

SUBJECT: Reconnaissance Report, Taylor Point Basin, Bourne, MA
CWIS No. 87562 (10th Congressional District)

1. A Reconnaissance Report for the subject project, prepared under the authority of Section 107 of the 1960 River and Harbor Act, as amended, has been completed, Federal assistance was requested by Rear Admiral John F. Aylmer of the Massachusetts Maritime Academy.

2. Ten copies of the subject report and Fact Sheet are attached. The report recommends no further study, based on insufficient economic justification. The study sponsor has been informed of our findings (copy of letter enclosed)

FOR THE COMMANDER:

THOMAS A. RHEN
Colonel, Corps of Engineers
Commanding

Enclosure

CONTINUING AUTHORITIES FACT SHEET
TAYLOR POINT BASIN
RECONNAISSANCE REPORT

Date: September 1987
New England Division

1. Project: Taylor Point Basin
Massachusetts Maritime Academy
Bourne, Massachusetts
CWIS: 87562

States: Massachusetts
County: Barnstable
Congressional District: 10th

2. Authority: Section 107 of the 1960 River and Harbor Act, as amended, for Small Navigation Projects.

3. Location of Study Area: The Taylor Point Basin is located on the mainland side of the Cape Cod Canal, at the West entrance to the Canal at the head of Buzzards Bay.

4. Dates of Corps Action: There have been no previous Corps reports concerning the subject project.

a) The Reconnaissance Phase was initiated as an Initial Appraisal on 12 March 1986.

5. Problems, Needs and Opportunities Identified: Three basic problems effecting navigation at Taylor Point were identified by the Maritime Academy and substantiated by NED.

a) Rapid shoaling of the basin dredged by the Mass. Division of Waterways results from migration of the shoals lying to the north and west. This shoaling necessitates maintenance dredging at 3-year intervals at a cost of about $200,000 per maintenance operation.

b) Storm damage from westerly gales and hurricanes results in damages to berthed vessels and occasional loss of small craft. Wave action also causes substantial damage to mooring dolphins and the bulkhead.

c) Winter ice damage has resulted in the loss of two training vessels, sunk at their moorings. Ice floes also damage mooring dolphins and contribute to bulkhead damage. Smaller training vessels and work boats must be stored upland or transferred to New Bedford during storms and the winter months.

All of the above problems contribute to increased vessel and shore structure repair costs, increased maintenance costs, vessel replacement costs and vessel transfer costs. The opportunity exists to reduce or eliminate these increased costs through provision of a basin protected from waves, ice floes and shoaling.

6. Alternative Plans Considered: Various options were considered for providing a breakwater to protect the basin as other conceptual solutions such as the permanent fleet transfer were not acceptable to the Academy. Rubble-mound, concrete A-frame and cellular-sheet-pile designs were examined.

7. Description of Recommended Plan: Any of the types of structures examined could be constructed to provide complete protection from all but the most severe storms. Based on least cost, the concrete A-frame was chosen for analysis. The structure, as shown in Figure 2, would extend 350 feet west from the shoreline to the north of the basin and then dogleg south 800 feet toward the Canal channel. The end of the structure would be set back 50 feet from the Canal's northern channel limit so as not to interfere with Canal maintenance or traffic. A lighted navigation aid would be placed on the end of the structure. The structure was designed in accordance with EM 1110-2-2904, 8 August 1986. Table 1 presents the costs, benefits and financial data concerning the considered plan.

8. Views of Sponsor: The Massachusetts Maritime Academy, through the State of Massachusetts is the study/project sponsor. The sponsor requested the study by letter dated 5 February 1986. This and other pertinent correspondence are attached. The considered plan fits the sponsor's needs for a protected basin. The sponsor would prefer a structure which would double as a pier, however, such a structure would be beyond the scope of Federal interest.

9. Views of Federal, State and Regional Agencies: As the considered plan was not carried forward beyond this Preliminary Reconnaissance level, no formal coordination was initiated. Coordination with resource agencies concerning conceptual schemes indicated that benthic resources were the primary concerns should further studies be considered.

10. NED PLAN: There is no NED Plan, the Considered Plan is not recommended as a basis for further study.

11. Status of NEPA Document: N/A

12. Significant Effects: N/A

13. Implementation Schedule: N/A

14. Supplemental Information: NONE

15. OCE Review: N/A

TABLE 1
TAYLOR POINT
CONTINUING AUTHORITIES FACT SHEET
RECONNAISSANCE REPORT

ECONOMIC AND FINANCIAL DATA
CONSIDERED PLAN
(NOT RECOMMENDED)

Estimated Implementation Costs: (May 1987 price levels, excluding IDC)		Economic Data: (8 7/8%, 50 year life)	
Federal - Initial (90%)	$3,112,000	Annual Charges:	$332,000
Federal - Ultimate(80%)	$2,766,000	(Includes $7,600 OM&R; All Federal)	
		Annual Benefits:	
U.S. Coast Guard	$ 14,000	Reduced Dredging	$ 73,000
Non-Federal - Initial (10%)	$346,000	Vessel Damage	10,000
Non-Federal - Ultimate	$692,000	Vessel Relocation	15,000
		Facility Damage	131,000
			$229,000
TOTAL	$3,472,000	BCR: 0.7	

Non-Federal Requirements: 10% Cash contribution and 10% repayment only.

Cost Allocation:

	Federal	Non-Federal	Avg Ann. Benefits
Commercial Navigation (All breakwater)	$2,762,000(80%)	$690,000(20%)	$229,000
TOTAL	$2,762,000	$690,000	$229,000

Allocations to Date:

	Federal	Non-Federal
Reconnaissance	$27,500*	None

Remaining Requirements:

No further study recommended.

* NOTE: Approximately $10,000 of this will be available for return transfer to the NED reconnaissance allocation.